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PLL vs DRO LNB – Which is better?

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What is the different between lnb pll and dro?

DRO vs PLL LNB FAQ Quite a few questions have come up about PLL and DRO LNB/LNBs. There has even been some criticism from certain people in the industry. Many people don't understand DRO or PLL. This FAQ should address most questions concerning DRO v PLL and explain what each will and will not do.

Q. What part of a LNB/LNBF does DRO or PLL refer to?

A. Every LNB/LNBF needs to generate a frequency known as the L.O. (Local Oscillator) frequency. This is used to mix with the satellite signal and to output a lower frequency that your satellite receiver can tune to. This is commonly called the "LNB frequency" in your STB settings. Examples are 10600, 10750 and 11250. DRO and PLL are two different L.O. types and methods used to generate the LNB frequency.

Q. What is the difference between DRO and PLL oscillators?

A. DRO (Dielectric Resonator Oscillator) is a simple device usually consisting of a ceramic disc that resonates at a desired frequency. DRO's are usually inexpensive, fluctuate greatly with temperature changes, and are typically not very stable. High stability DRO's do exist and are very expensive. DRO's used in cheap LNB/LNBs are of the inexpensive, less stable design, with a typical stability of +/- 1MHz to 3MHz.

PLL (Phase Locked Loop) oscillators, simply put, use a more accurate reference clock and a circuit that repeatedly feeds back the output signal and adjusts its output to be accurate and stable. PLLs are typically more expensive, especially for higher frequencies

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and are used in devices where a high degree of accuracy is required. PLLs do not suffer nearly as much from temperature/frequency variations. PLL's in commercial grade expensive LNB/LNBs have stabilities from +/- 500kHz all the way down to 25kHz or better.

Q. Who uses DRO LNB/LNBs?

A. DRO's are typically used in cheaper LNB/LNBs by end users that do not require a high degree of accuracy for signal conversion and reception. They work sufficiently to lock large bandwidth or "fat" signals such as most DVB-S MPEG-2 carriers that do not require sophisticated equipment or accuracy to receive. Manufacturers use DRO's for end user products because of ease of manufacture and super low cost. A good example of where a DRO performs "adequately" would be most of the religious and ethnic programming on 97W/Galaxy 19. These powerful and out of date DVB-S MPEG-2 signals do not require stability and accuracy for decent reception. Almost any brand low quality LNB/LNB will work for these type of signals.

Q. Who uses PLL LNB/LNBs?

A. Until recently PLLs have been used almost exclusively by commercial customers that require a high degree of accuracy, stability, and the ability to lock low bandwidth and/or weak satellite signals. Some well off hardcore hobbyists run similar equipment to commercial setups, typically costing \$300 – \$1000+ for the individual feed and LNBs.

Q. Will a PLL LNB/LNB outperform a typical DRO?

A. Normally yes, but not always. It depends on the type of signal. The before mentioned "fat" and powerful DVB-S MPEG-2 signals on 97W/Galaxy 19 already come in super strong and perform well on outdated equipment. A PLL is not needed nor will it help much under these conditions. In fact, if you have a fixed, dedicated dish and a middle of the road LNB optimized for that dish you might be able to achieve slightly better levels than a PLL on the same setup. If you happen to be one of the very few people that only receives religious or ethnic programming for 97W with a dedicated MPEG-2 only system a DRO will work just fine. For the remaining 99.999% of the market a PLL will almost always outperform any of the cheap DRO's on the market.

I do see some gain on 97W with a PLL, but nothing dramatic and nothing compared to PLL performance on more difficult signals.

-A PLL will almost always significantly outperform DRO on weak signals.

-A PLL will almost always significantly outperform DRO on DVB-S2 signals.

-A PLL will almost always significantly outperform DRO on high FEC signals.

-A PLL will lock and bring in signals that even a good DRO cannot.

Q. Why does a PLL perform better on difficult signals?

A. A simple analogy would be threading a needle. Someone with shaky hands (a less stable DRO) will probably be able to thread a big needle (fat, strong signal) successfully. A steady handed person (high stability PLL) can thread the same needle with the same results. Now take a fine needle with a very small head (narrow bandwidth DVB-S2 signal). The shaky hands (less stable DRO) either cannot do it at all or will be very slow and poor performing at the task. The non-shaking hands (PLL with stable signal) is able to thread the small needle without much difficulty.

Q. If a PLL is so much better and more expensive, how does DMS suddenly have them at a low price?

A. A manufacturer recently developed a whole PLL oscillator on a single IC for Ku band applications. The IC is manufactured in great quantities (30,000pc minimum order) allowing prices to come down compared to other PLL LNBs. The technology advancement along with the manufacturing quantity has dropped the cost to build a PLL LNB/LNB significantly.

Q. Why doesn't anyone else have an inexpensive PLL yet?

A. They will eventually. None of the American distributors have the money or influence to buy the 30,000pc minimum of the new IC. They will have to wait for a company in China to do it, and then buy smaller quantities of an "off the shelf" with a private label on it. DMS is partnered with the Taiwan company that manufactures the new Ku PLL.

Strangely enough, one of the other USA satellite distributors that is highly critical of PLLs attempted to buy the PLL from the Taiwan company and became critical of the PLL and company only after being turned down!

Q. Who are the main critics of the new Ku PLL, and PLL's in general?

A. Distributors and dealers with warehouses full of outdated DRO's that are not selling. Guys that have a narrow range of customers that only aim at 97W/Galaxy 19. Guys that have not tested it for themselves.

Q. Do I really need to buy a PLL?

A. Depends.

If all you receive is "fat" DVB-S MPEG-2 like 97W/Galaxy 19 and you don't have signal issues or missing channels, what you have will work just fine.

If you are a typical FTA hobbyist, you will benefit from a PLL. You will get higher signal strengths (quality) on most signals, higher rain fade resistance, higher stability. You will almost certainly be able to bring in more channels and stabilize weaker and borderline feeds. PLL will help stabilize troublesome DVB-S2 signals. If you have problems with Montana PBS, NBC S2, FSTV or LPBS the PLL will likely help. If you feedhunt you should lock more wildfeeds and bring in many of the weaker ones.

Q. Will a PLL solve every issue?

A. No. There are always limits such as your other equipment, installation, or signals that are just out of reach. This will always be the case in the FTA hobby at any level. PLL will almost certainly significantly improve and stabilize your current hobby system and allow you to get the maximum out of your dish size and DVB-S2 STB